

Kimberly Tisa/R1/USEPA/US  
07/12/2005 06:19 AM

To Laura Casey/DC/USEPA/US  
cc  
bcc  
Subject Fw: Contact Info

Hi Laura-

Attached is additional information from Clariant responsive to Versar's request on calculations.

Kimberly Tisa, PCB Coordinator (CPT)  
USEPA  
1 Congress Street, Suite 1100  
Boston, MA 02114-2023

617.918.1527 (PHONE)  
617.918.0527 (FAX)  
e-mail: tisa.kimberly@epa.gov

----- Forwarded by Kimberly Tisa/R1/USEPA/US on 07/12/2005 06:19 AM -----



JOHN SCHELL  
<js1@bbl-inc.com>  
07/11/2005 10:20 AM

To Kimberly Tisa/R1/USEPA/US@EPA  
cc Mike Teague <Mike.Teague@clariant.com>  
Subject Re: Contact Info

Kimberly:

Attached is one additional set of calculations which addresses Versar's request that we conduct a "forward" risk calculation to prove that the risk-based PCB concentrations are correct. After you and your group have had a chance to review these, if you have any questions, please let me know

John

*per 6/20/2005  
Versar comments*

John D. Schell, Ph.D.  
Vice President/Toxicologist  
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>>> <tisa.kimberly@epamail.epa.gov> 06/21/05 5:34 AM >>>

As discussed last week, the attached memo provides the additional information Versar has indicated it needs to support the calculations in the carpet exposure scenario. Should you have any questions, please let me know. Thanks.

(See attached file: Clariant data needs 6202005.wpd)

Kimberly Tisa, PCB Coordinator (CPT)

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JOHN SCHELL

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m>

To

Kimberly Tisa/R1/USEPA/US@EPA

06/16/2005

cc

04:04 PM

Mike Teague

<Mike.Teague@clariant.com>

Subject

Contact Info

Kim:

Mike requested that I forward my contact information to you. If you have any questions, please give me a call. Thanks.

John

John D. Schell, Ph.D.  
Vice President/Toxicologist  
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Forward Calcs 7.8.doc

### Forward Risk Calculations for Risk-Based Pigment Concentrations

The Total Noncancer Hazard Quotient is calculated as follows:

$$\text{Total Average Daily Dose (ADD)} = \text{ADD}_{\text{ingestion}} + \text{ADD}_{\text{dermal}} + \text{ADD}_{\text{inhalation}}$$

where,

$$\text{ADD}_{\text{ingestion}} (\text{mg/kg/day}) = \frac{\text{CNC}_{\text{carpet}} \times \text{IR} \times \text{BioAF} \times \text{EF} \times \text{ED} \times \text{CF}}{\text{BW} \times \text{ATnc}}$$

$$\text{ADD}_{\text{dermal}} (\text{mg/kg/day}) = \frac{\text{CNC}_{\text{carpet}} \times \text{SA} \times \text{AF} \times \text{DERM} \times \text{EF} \times \text{ED} \times \text{CF}}{\text{BW} \times \text{ATnc}}$$

$$\text{ADD}_{\text{inhalation}} (\text{mg/kg/day}) = \frac{\text{CNC}_{\text{carpet}} \times \text{IHR} \times 1/\text{VF} \times \text{RF} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{ATnc}}$$

where,

CNC <sub>carpet</sub>	133	risk-based concentration in carpet fiber associated with hazard quotient of 1 (mg/kg)
ED	10	exposure duration (yr)
EF	350	exposure frequency (days/yr)
IR	55	dust ingestion rate (mg/day)
BioAF	0.01	bioavailability factor for ingestion (unitless)
SA	2,763	contact skin surface area (cm <sup>2</sup> /day)
AF	0.00724	dust adherence factor (mg/cm <sup>2</sup> )
DERM	0.14	dermal absorption factor (unitless)
CF	1E-06	conversion factor (kg/mg)
IHR	10.6	inhalation rate (m <sup>3</sup> /day)
VF	1.38E+05	volatilization factor (m <sup>3</sup> /kg)
RF	0.001	retention factor (unitless)
BW	21.8	body weight (kg)
AT <sub>nc</sub>	3,650	non-cancer averaging time (days)
RfD	0.00002	reference dose (mg/kg/day)

As a result,

$$\text{ADD}_{\text{ingestion}} (\text{mg/kg/day}) =$$

$$\frac{133 \text{ mg/kg} \times 55 \text{ mg/day} \times 0.01 \times 350 \text{ days/yr} \times 10 \text{ yrs} \times 1\text{E} - 06 \text{ kg/mg}}{21.8 \text{ kg} \times 3,650 \text{ days}}$$

$$= 3.2\text{E}-06$$

$$\text{ADD}_{\text{dermal}} (\text{mg/kg/day}) =$$

$$\frac{133 \text{ mg/kg} \times 2,763 \text{ cm}^2/\text{day} \times 0.00724 \text{ mg/cm}^2 \times 0.14 \times 350 \text{ days/yr} \times 10 \text{ yr} \times 1\text{E} - 06 \text{ kg/mg}}{21.8 \text{ kg} \times 3,650 \text{ days}}$$

$$= 1.6\text{E}-05$$

ADD<sub>Inhalation</sub> (mg/kg/day) =

$$\frac{133 \text{ mg/kg} \times 10.6 \text{ m}^3/\text{day} \times \left( \frac{1}{1.38\text{E} + 05 \text{ m}^3/\text{kg}} \right) \times 0.001 \times 350 \text{ days/yr} \times 10 \text{ yrs}}{21.8 \text{ kg} \times 3,650 \text{ days}}$$
$$= 4.2\text{E}-07$$

$$\text{Total ADD (mg/kg/day)} = 3.2\text{E}-06 + 1.6\text{E}-05 + 4.2\text{E}-07 = 2.0\text{E}-05$$

$$\text{Hazard Index} = \text{Total ADD (mg/kg/day)} \div \text{Reference Dose (mg/kg/day)}$$

$$\text{Hazard Index} = 2.0\text{E}-05 \text{ (mg/kg/day)} \div 0.00002 \text{ (mg/kg/day)} = 1$$

The Total Lifetime Cancer Risk is calculated as follows:

Total Lifetime Average Daily Dose (LADD) = LADD<sub>ingestion</sub> + LADD<sub>dermal</sub> + LADD<sub>inhalation</sub>

where,

$$\text{LADD}_{\text{ingestion}} (\text{mg/kg/day}) = \frac{\text{CNC}_{\text{carpet}} \times \text{IR} \times \text{BioAF} \times \text{EF} \times \text{ED} \times \text{CF}}{\text{BW} \times \text{ATc}}$$

$$\text{LADD}_{\text{dermal}} (\text{mg/kg/day}) = \frac{\text{CNC}_{\text{carpet}} \times \text{SA} \times \text{AF} \times \text{DERM} \times \text{EF} \times \text{ED} \times \text{CF}}{\text{BW} \times \text{ATc}}$$

$$\text{LADD}_{\text{inhalation}} (\text{mg/kg/day}) = \frac{\text{CNC}_{\text{carpet}} \times \text{IHR} \times 1/\text{VF} \times \text{RF} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{ATc}}$$

where,

CNC <sub>carpet</sub>	664	risk-based concentration in carpet fiber associated with target risk of 1 in a million (mg/kg)
ED	10	exposure duration (yr)
EF	350	exposure frequency (days/yr)
IR	55	dust ingestion rate (mg/day)
BioAF	0.01	bioavailability factor for ingestion (unitless)
SA	2,763	contact skin surface area (cm <sup>2</sup> /day)
AF	0.00724	dust adherence factor (mg/cm <sup>2</sup> )
DERM	0.14	dermal absorption factor (unitless)
CF	1E-06	conversion factor (kg/mg)
IHR	10.6	inhalation rate (m <sup>3</sup> /day)
VF	1.38E+05	volatilization factor (m <sup>3</sup> /kg)
RF	0.001	retention factor (unitless)
BW	21.8	body weight (kg)
AT <sub>c</sub>	25,550	non-cancer averaging time (days)
SF	0.07	slope factor (per mg/kg/day)

As a result,

$$\text{LADD}_{\text{ingestion}} (\text{mg/kg/day}) =$$

$$\frac{664 \text{ mg/kg} \times 55 \text{ mg/day} \times 0.01 \times 350 \text{ days/yr} \times 10 \text{ yrs} \times 1\text{E} - 06 \text{ kg/mg}}{21.8 \text{ kg} \times 25,550 \text{ days}}$$

$$= 2.3\text{E}-06$$

$$\text{LADD}_{\text{dermal}} (\text{mg/kg/day}) =$$

$$\frac{664 \text{ mg/kg} \times 2763 \text{ cm}^2/\text{day} \times 0.00724 \text{ mg/cm}^2 \times 0.14 \times 350 \text{ days/yr} \times 10 \text{ yrs} \times 1\text{E} - 06 \text{ kg/mg}}{21.8 \text{ kg} \times 25,550 \text{ days}}$$

$$= 1.2\text{E}-05$$



LADD<sub>inhalation</sub> (mg/kg/day) =

$$\frac{664 \text{ mg/kg} \times 10.6 \text{ m}^3/\text{day} \times \left( \frac{1}{1.38\text{E} + 05 \text{ m}^3/\text{kg}} \right) \times 0.001 \times 350 \text{ days/yr} \times 10 \text{ yrs}}{21.8 \text{ kg} \times 25,550 \text{ days}}$$

$$= 3.2\text{E-}07$$

$$\text{Total ADD (mg/kg/day)} = 2.3\text{E-}06 + 1.2\text{E-}05 + 3.2\text{E-}07 = 1.5\text{E-}05$$

Total Lifetime Cancer Risk = Total LADD (mg/kg/day) x slope factor (per mg/kg/day)

$$\text{Total Lifetime Cancer Risk} = 1.5\text{E-}05 \text{ (mg/kg/day)} \times 0.07 \text{ (mg/kg/day)} = 1\text{E-}06$$




Laura Casey/DC/USEPA/US  
07/11/2005 11:15 AM

To buchejam@versar.com, DSinkowski@versar.com  
cc Tom Simons/DC/USEPA/US@EPA, Kimberly  
Tisa/R1/USEPA/US@EPA  
bcc

Subject Fw: Clariant Response to Versar 6/20 Comments

History:

 This message has been replied to.

Good Morning

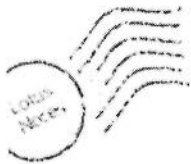
The attached E-mail contains Clariant's responses to Versar request for clarification/information during the conference call on June 16th. Please review the information and determine if your needs have been met. Please contact me if you need any further information.

Please let me know if you need a more formal technical direction memo of if this E-mail will suffice.

Thanks

Laura Casey

----- Forwarded by Laura Casey/DC/USEPA/US on 07/11/2005 11:12 AM -----



Kimberly Tisa/R1/USEPA/US  
07/08/2005 01:22 PM

To Laura Casey/DC/USEPA/US@EPA  
cc  
Subject Clariant Response to Versar 6/20 Comments

Laura-

As discussed, following is Clariant's response to Versar's June 20, 2005 on the human health risk assessment, specifically related to inhalation and volatilization. I am attaching Versar's comments for your reference. Please have Versar review Clariant's response to determine if Versar's comments have been satisfactorily addressed. Please call with any questions. Thanks much!



Clariant data needs 6202005.wpd

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----- Forwarded by Kimberly Tisa/R1/USEPA/US on 07/08/2005 01:18 PM -----



JOHN SCHELL  
<js1@bbl-inc.com>  
07/08/2005 11:55 AM

To Kimberly Tisa/R1/USEPA/US@EPA  
cc  
Subject Re: Contact Info



Kimberly:

Attached are the spread sheets containing the senativity analysis requested in EPA's most recent comment letter. the calculations were intended to illustrate the effect of varying the VF value on the percent contribution to the total exposure from the inhalation pathway. As you will see, at the VFs of 1% or less, the inhalation pathway is only a minor contributor to the total exposure. Not until we use a VF of 100% does it have a major effect.

I am currently out of the office, but will be in on Monday and the eary part of tuesday before I will have to head back out. If you and your group would like to discuss these, or if you want a more detailed description of the calculations (they are identical t the ones in the report), let me know and we can provide that to you next week.

John

John D. Schell, Ph.D.  
Vice President/Toxicologist  
BBL Sciences  
2929 Briarpark Dr., Suite 329  
Houston, TX 77042  
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>>> <tisa.kimberly@epamail.epa.gov> 06/21/05 6:34 AM >>>

As discussed last week, the attached memo provides the additional information Versar has indicated it needs to support the calculations in the carpet exposure scenario. Should you have any questions, please let me know. Thanks.

(See attached file: Clariant data needs 6202005.wpd)

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e-mail: tisa.kimberly@epa.gov

JOHN SCHELL  
<js1@bbl-inc.co  
m>

06/16/2005  
04:04 PM

Kimberly Tisa/R1/USEPA/US@EPA

To

Mike Teague  
<Mike.Teague@clariant.com>

cc

Contact Info

Subject

Kim:

Mike requested that I forward my contact information to you. If you have any questions, please give me a call. Thanks.

John

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forward calcs2\_7.5.xls



JOHN SCHELL  
<js1@bbl-inc.com>  
07/08/2005 11:55 AM

To: Kimberly Tisa/R1/USEPA/US@EPA

cc

bcc

Subject: Re: Contact Info

History:

➡ This message has been forwarded.

Kimberly:

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JOHN SCHELL  
<js1@bbl-inc.co  
m>

06/16/2005  
04:04 PM

Kimberly Tisa/R1/USEPA/US@EPA

Mike Teague  
<Mike.Teague@clariant.com>

Contact Info

To

cc

Subject

Kim:

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forward calcs2\_7.5.xls

Inputs:

TR	1.00E-06	TR=Target cancer risk
SF	0.07	SF=Cancer slope factor
ATnc	3650	ATnc = Averaging time for noncarcinogens (days)
ATc	25550	ATc=Averaging time for carcinogens (days)
ED	10	ED <sub>y</sub> =Exposure duration (carpet life; yrs)
	10	Carpet life expectancy 7- 10 years
EF	350	EF=Exposure frequency (days/yr)
IR	55	IR=Dust (soil) ingestion rate (mg/day)

AF	0.00724	AF=Soil adherence factor for children post-activity indoors on hands, arms, legs, feet (mg/cm <sup>2</sup> )
SA	2763	SA=Contact skin surface area during warm-weather play with 32% skin exposed (cm <sup>2</sup> /day)
BW	21.8	BW=Body weight (children 6 months to 12 yrs old; kg)
BioAF	range	BioAF=Bioavailability factor (unitless)
IHR	10.42	IHR=Inhalation rate (m <sup>3</sup> /day)
VP	0.0069	VP=Vapor pressure of PCB44/70 mixture (Pa)
dw	0.0129	d <sub>w</sub> =Carpet thickness (m)
Mass	1700000	Carpet mass=Carpet area mass (face weight; kg/m <sup>2</sup> )
AE	126	AE=Complete room air exchange rate (1/week; based on recommended 0.35 exchanges/hr)

Cg	see below	C <sub>g</sub> =Air concentration in an enclosed space after 7 days post-installation (mg/m <sup>3</sup> )
DERM	0.14	DERM= Dermal uptake factor (US EPA)
RF	range	RF = Retention Factor (unitless)

Volatilization Factor

Based on Empirical Data, Vapor Pressure, and Mass Balance Models

	1.445152E+05	Surface-air partition coefficient for carpet (unitless)	K <sub>oa</sub> =(k <sub>o</sub> /k <sub>a</sub> )(d <sub>w</sub> = 10 <sup>-3</sup> ft=0.3048m)
		k <sub>o</sub> /k <sub>a</sub> =M/C <sub>air</sub> =d <sub>w</sub> * 10 <sup>3</sup> ft=0.3048m	
		M (mg/m <sup>2</sup> )=C <sub>air</sub> *d <sub>w</sub> *10 <sup>3</sup> ft=0.3048m	
		M/C <sub>air</sub> = d <sub>w</sub> *10 <sup>3</sup> ft=0.3048m	
		C <sub>carpet</sub> (mg/kg) = M (mg/m <sup>2</sup> )/Mass <sub>c</sub> (kg/m <sup>2</sup> )	
VF	137745.099178	VF (m <sup>3</sup> /kg)= [d <sub>w</sub> (m)*10 <sup>3</sup> ft=0.3048m]/[Mass <sub>c</sub> (mg/m <sup>2</sup> )/1000000 (mg/kg)]/AE	

Lifetime Cancer Risk												
Slope Factor (per mg/kg-day)			Dermal Absorption Factor		Retention Factor		Concentration (mg/kg)		Ingestion		Total	
Chemicals	SF	Bio	Derm	RF	Conc	Ingestion	% of Total	Dermal	% of Total	Inhalation	% of Total	Lifetime Cancer Risk
PCBs	0.07	0.01	0.14	0.001	664	1.0E-07	16.1%	8.2E-07	81.7%	2.2E-08	2.2%	1.0E-06 100.0%
PCBs	0.07	0.05	0.14	0.001	404	4.9E-07	48.9%	5.0E-07	49.8%	1.3E-08	1.3%	1.0E-06 100.0%
PCBs	0.07	0.1	0.14	0.001	271	6.6E-07	65.7%	3.3E-07	33.4%	9.0E-09	0.9%	1.0E-06 100.0%
PCBs	0.07	0.5	0.14	0.001	74.8	9.0E-07	90.5%	9.2E-08	9.2%	2.5E-09	0.2%	1.0E-06 100.0%
PCBs	0.07	1	0.14	0.001	39.3	9.5E-07	95.0%	4.8E-08	4.8%	1.3E-09	0.1%	1.0E-06 100.0%

Lifetime Cancer Risk												
Slope Factor (per mg/kg-day)			Dermal Absorption Factor		Retention Factor		Concentration (mg/kg)		Ingestion		Total	
Chemicals	SF	Bio	Derm	RF	Conc	Ingestion	% of Total	Dermal	% of Total	Inhalation	% of Total	Lifetime Cancer Risk
PCBs	0.07	0.01	0.14	0.005	610	1.5E-07	14.8%	7.5E-07	75.1%	1.0E-07	10.1%	1.0E-06 100.0%
PCBs	0.07	0.05	0.14	0.005	384	4.6E-07	46.4%	4.7E-07	47.2%	6.4E-08	6.4%	1.0E-06 100.0%
PCBs	0.07	0.1	0.14	0.005	262	6.3E-07	63.4%	3.2E-07	32.3%	4.4E-08	4.4%	1.0E-06 100.0%
PCBs	0.07	0.5	0.14	0.005	74.1	9.0E-07	89.6%	9.1E-08	9.1%	1.2E-08	1.2%	1.0E-06 100.0%
PCBs	0.07	1	0.14	0.005	39.1	9.5E-07	94.5%	4.8E-08	4.8%	6.5E-09	0.7%	1.0E-06 100.0%

Lifetime Cancer Risk												
Slope Factor (per mg/kg-day)			Dermal Absorption Factor		Retention Factor		Concentration (mg/kg)		Ingestion		Total	
Chemicals	SF	Bio	Derm	RF	Conc	Ingestion	% of Total	Dermal	% of Total	Inhalation	% of Total	Lifetime Cancer Risk
PCBs	0.07	0.01	0.14	0.01	554	1.3E-07	13.4%	6.8E-07	88.2%	1.8E-07	18.4%	1.0E-06 100.0%
PCBs	0.07	0.05	0.14	0.01	361	4.4E-07	43.6%	4.4E-07	44.4%	1.2E-07	12.0%	1.0E-06 100.0%
PCBs	0.07	0.1	0.14	0.01	251	6.1E-07	60.7%	3.1E-07	30.9%	8.4E-08	8.4%	1.0E-06 100.0%
PCBs	0.07	0.5	0.14	0.01	73.2	8.9E-07	88.5%	9.0E-08	9.0%	2.4E-08	2.4%	1.0E-06 100.0%
PCBs	0.07	1	0.14	0.01	38.8	9.4E-07	93.9%	4.8E-08	4.8%	1.3E-08	1.3%	1.0E-06 100.0%

Lifetime Cancer Risk												
Slope Factor (per mg/kg-day)			Dermal Absorption Factor		Retention Factor		Concentration (mg/kg)		Ingestion		Total	
Chemicals	SF	Bio	Derm	RF	Conc	Ingestion	% of Total	Dermal	% of Total	Inhalation	% of Total	Lifetime Cancer Risk
PCBs	0.07	0.01	0.14	1	28.8	7.0E-09	0.7%	3.5E-08	3.5%	9.6E-07	95.8%	1.0E-06 100.0%
PCBs	0.07	0.05	0.14	1	28.0	3.4E-08	3.4%	3.4E-08	3.4%	9.3E-07	93.2%	1.0E-06 100.0%
PCBs	0.07	0.1	0.14	1	27.1	6.6E-08	6.6%	3.3E-08	3.3%	9.0E-07	90.1%	1.0E-06 100.0%
PCBs	0.07	0.5	0.14	1	21.5	2.6E-07	26.0%	2.6E-08	2.6%	7.2E-07	71.4%	1.0E-06 100.0%
PCBs	0.07	1	0.14	1	17.0	4.1E-07	41.2%	2.1E-08	2.1%	5.7E-07	56.7%	1.0E-06 100.0%



## INPUTS

TR	1.00E-06	TR=Target cancer risk
SF	0.07	SF=Cancer slope factor
ATinc	3650	ATinc = Averaging time for noncarcinogens (days)
ATc	25550	AT <sub>c</sub> =Averaging time for carcinogens (days)
ED	10	ED <sub>c</sub> =Exposure duration (carpet life; yrs)
	10	Carpet life expectancy 7- 10 years
EF	350	EF=Exposure frequency (days/yr)
IR	55	IR=Dust (soil) ingestion rate (mg/day)

AF	0.00724	AF=Soil adherence factor for children post-activity indoors on hands, arms, legs, feet (mg/cm <sup>2</sup> )
SA	2763	SA=Contact skin surface area during warm-weather play with 32% skin exposed (cm <sup>2</sup> /day)
BW	21.8	BW=Body weight (children 6 months to 12 yrs old; kg)
BioAF	range	BioAF=Bioavailability factor (unitless)
IHR	10.42	IHR=Inhalation rate (m <sup>3</sup> /day)
VP	0.0069	VP=Vapor pressure of PCB44/70 mixture (Pa)
dw	0.0129	d <sub>w</sub> =Carpet thickness (m)
Mass	1700000	Carpet mass=Carpet area mass (face weight; kg/m <sup>2</sup> )
AE	126	AE=Complete room air exchange rate (1/week; based on recommended 0.35 exchanges/hr)

Cg	see below	C <sub>g</sub> =Air concentration in an enclosed space after 7 days post-installation (mg/m <sup>3</sup> )
DERM	0.14	DERM= Dermal uptake factor (US EPA)
RF	range	RF = Retention Factor (unitless)

## Volatilization Factor

### Based on Empirical Data, Vapor Pressure, and Mass Balance Models

	1.445152E+05	Surface-air partition coefficient for carpet (unitless)	K <sub>ca</sub> =(k <sub>s</sub> /k <sub>g</sub> )/dw = 10 <sup>3</sup> 83-0 62logVP
		k <sub>s</sub> /k <sub>g</sub> =M/C <sub>air</sub> =d <sub>w</sub>	
		M (mg/m2)=C <sub>air</sub> *d <sub>w</sub> *10 <sup>3</sup> 83-0 62logVP	
		M/C <sub>air</sub> = d <sub>w</sub> *10 <sup>3</sup> 83-0 62logVP	
		C <sub>carpet</sub> (mg/kg) = M (mg/m2)/Mass <sub>c</sub> (kg/m2)	
VF	137745.099178	VF (m3/kg)=(d <sub>w</sub> (m)*10 <sup>3</sup> 83-0 62logVP)/[Mass <sub>c</sub> (mg/m2)/1000000 (mg/kg)]/AE	

Hazard Quotient													
Reference Dose (mg/kg-day)	Bioavailability	Dermal Absorption Factor	Retention Factor	Conc (mg/kg)	Hazard Quotient						Total Hazard Index		
					Ingestion	% of Total	Dermal	% of Total	Inhalation	% of Total			
Chemicals	RfD	Bio	Derm	RF	Conc								
PCBs	0.00002	0.01	0.14	0.001	133	1.6E-01	16.1%	8.2E-01	81.7%	2.2E-02	2.2%	1.0E+00	100.0%
PCBs	0.00002	0.05	0.14	0.001	80.8	4.9E-01	48.9%	5.0E-01	49.8%	1.3E-02	1.3%	1.0E+00	100.0%
PCBs	0.00002	0.1	0.14	0.001	54.3	6.6E-01	65.7%	3.3E-01	33.4%	9.0E-03	0.9%	1.0E+00	100.0%
PCBs	0.00002	0.5	0.14	0.001	15.0	9.1E-01	90.5%	9.2E-02	9.2%	2.5E-03	0.2%	1.0E+00	100.0%
PCBs	0.00002	1	0.14	0.001	7.9	9.6E-01	95.0%	4.9E-02	4.8%	1.3E-03	0.1%	1.0E+00	100.0%

Hazard Quotient														
Reference Dose (mg/kg-day)	Bioavailability	Dermal		Retention Factor	Concentration (mg/kg)	Hazard Quotient								
		Absorption Factor	RF			Ingestion	% of Total	Dermal	% of Total	Inhalation	% of Total	Total Hazard Index		
Chemicals	RfD	Bio	Derm	RF	Conc									
PCBs	0.00002	0.01	0.14	0.005	122	1.5E-01	14.8%	7.5E-01	75.1%	1.0E-01	10.1%	1.0E+00	100.0%	
PCBs	0.00002	0.05	0.14	0.005	76.7	4.6E-01	46.4%	4.7E-01	47.2%	6.4E-02	6.4%	1.0E+00	100.0%	
PCBs	0.00002	0.1	0.14	0.005	52.4	6.3E-01	63.4%	3.2E-01	32.3%	4.4E-02	4.4%	1.0E+00	100.0%	
PCBs	0.00002	0.5	0.14	0.005	14.8	9.0E-01	89.6%	9.1E-02	9.1%	1.2E-02	1.2%	1.0E+00	100.0%	
PCBs	0.00002	1	0.14	0.005	7.8	9.4E-01	94.5%	4.8E-02	4.8%	6.5E-03	0.7%	1.0E+00	100.0%	

Hazard Quotient												
Reference Dose (mg/kg-day)	Bioavailability	Dermal Absorption Factor		Retention Factor	Concentration (mg/kg)	Ingestion						
		Derm	RF			% of Total	Dermal	% of Total	Inhalation	% of Total	Total Hazard Index	
Chemicals	RfD	Bio	Derm	RF	Conc	Ingestion	% of Total	Dermal	% of Total	Inhalation	% of Total	Total Hazard Index
PCBs	0.00002	0.01	0.14	0.01	111	1.3E-01	13.4%	6.8E-01	68.2%	1.8E-01	18.4%	1.0E+00 100.0%
PCBs	0.00002	0.05	0.14	0.01	72.1	4.4E-01	43.6%	4.4E-01	44.4%	1.2E-01	12.0%	1.0E+00 100.0%
PCBs	0.00002	0.1	0.14	0.01	50.2	6.1E-01	60.7%	3.1E-01	30.9%	8.4E-02	8.4%	1.0E+00 100.0%
PCBs	0.00002	0.5	0.14	0.01	14.6	8.8E-01	88.5%	9.0E-02	9.0%	2.4E-02	2.4%	1.0E+00 100.0%
PCBs	0.00002	1	0.14	0.01	7.8	9.4E-01	93.9%	4.8E-02	4.8%	1.3E-02	1.3%	1.0E+00 100.0%

Hazard Quotient													
Reference Dose (mg/kg-day)	Bioavailability	Dermal Absorption Factor	Retention Factor	Conc (mg/kg)	Ingestion			Dermal			Inhalation		
					% of Total	% of Total	% of Total	% of Total	% of Total	% of Total			
Chemicals	RfD	Bio	Derm	RF									
PCBs	0.00002	0.01	0.14	1	5.8	7.0E-03	0.7%	3.6E-02	3.5%	9.6E-01	95.8%	1.0E+00	100.0%
PCBs	0.00002	0.05	0.14	1	5.6	3.4E-02	3.4%	3.4E-02	3.4%	9.3E-01	93.2%	1.0E+00	100.0%
PCBs	0.00002	0.1	0.14	1	5.4	6.5E-02	6.6%	3.3E-02	3.3%	9.0E-01	90.1%	1.0E+00	100.0%
PCBs	0.00002	0.5	0.14	1	4.3	2.6E-01	26.0%	2.6E-02	2.6%	7.2E-01	71.4%	1.0E+00	100.0%
PCBs	0.00002	1	0.14	1	3.4	4.1E-01	41.2%	2.1E-02	2.1%	5.7E-01	56.7%	1.0E+00	100.0%